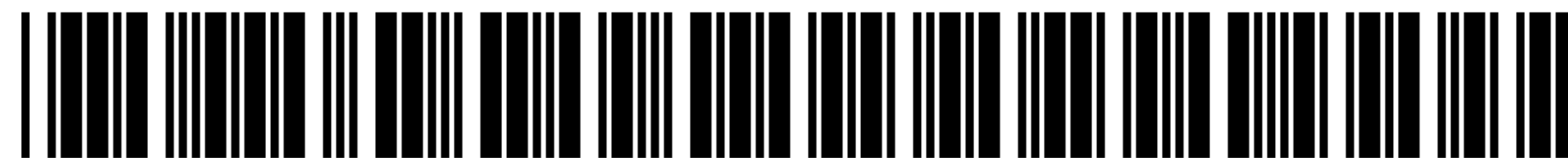


# Exhibit 2



US009491286B2

(12) **United States Patent**  
**Sharpe**

(10) **Patent No.:** **US 9,491,286 B2**  
(45) **Date of Patent:** **\*Nov. 8, 2016**

(54) **METHODS AND SYSTEMS FOR INBOUND CALL CONTROL**

(71) Applicant: **Kedlin Company, LLC**, Bellevue, WA (US)

(72) Inventor: **Benjamin Sharpe**, Bellevue, WA (US)

(73) Assignee: **KEDLIN COMPANY, LLC**, Bellevue, WA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/552,267**

(22) Filed: **Nov. 24, 2014**

(65) **Prior Publication Data**

US 2015/0078542 A1 Mar. 19, 2015

**Related U.S. Application Data**

(63) Continuation of application No. 14/038,396, filed on Sep. 26, 2013, now Pat. No. 8,917,843.

(60) Provisional application No. 61/715,076, filed on Oct. 17, 2012.

(51) **Int. Cl.**

**H04M 1/56** (2006.01)

**H04M 15/06** (2006.01)

**H04M 3/38** (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC ..... **H04M 3/38** (2013.01); **H04M 3/42059** (2013.01); **H04M 3/436** (2013.01); **H04M 3/4365** (2013.01); **H04M 3/53308** (2013.01)

(58) **Field of Classification Search**

CPC .... H04M 3/4365; H04M 1/57; H04M 1/663; H04M 1/665; H04M 2203/2005; H04M 3/436; A01B 12/006

USPC ..... 379/88.19, 88.2, 88.21, 93.17, 93.23, 379/142.01, 142.02, 142.04, 142.06, 379/142.17, 201.01, 201.02, 207.13, 379/207.15, 210.02, 211.02, 210.03

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,813,344 B1 \* 11/2004 Lemke ..... H04M 1/575 379/142.01

7,027,569 B2 \* 4/2006 Price ..... 379/88.16

(Continued)

*Primary Examiner* — Binh Tieu

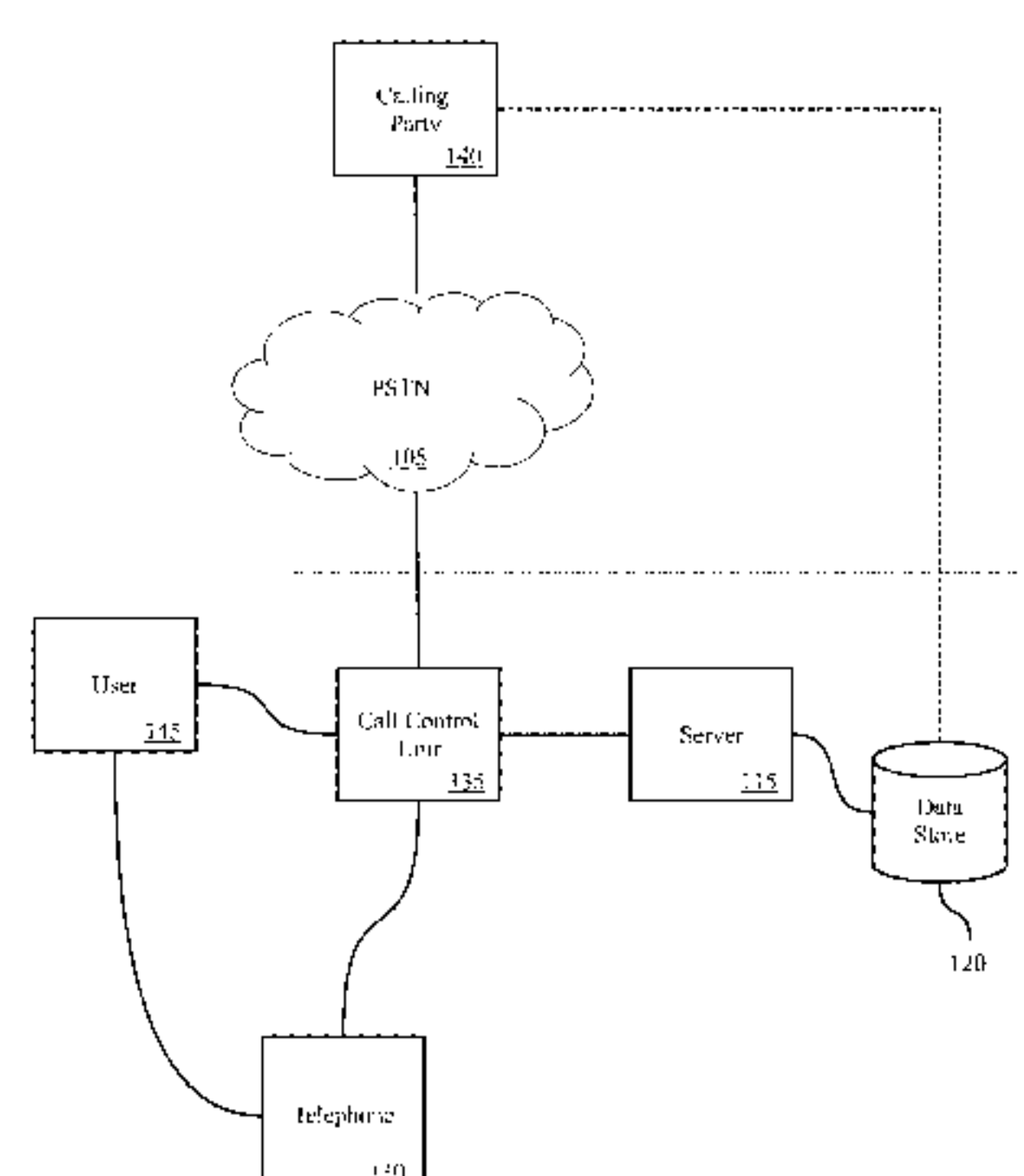
(74) *Attorney, Agent, or Firm* — Ascenda Law Group, PC

(57) **ABSTRACT**

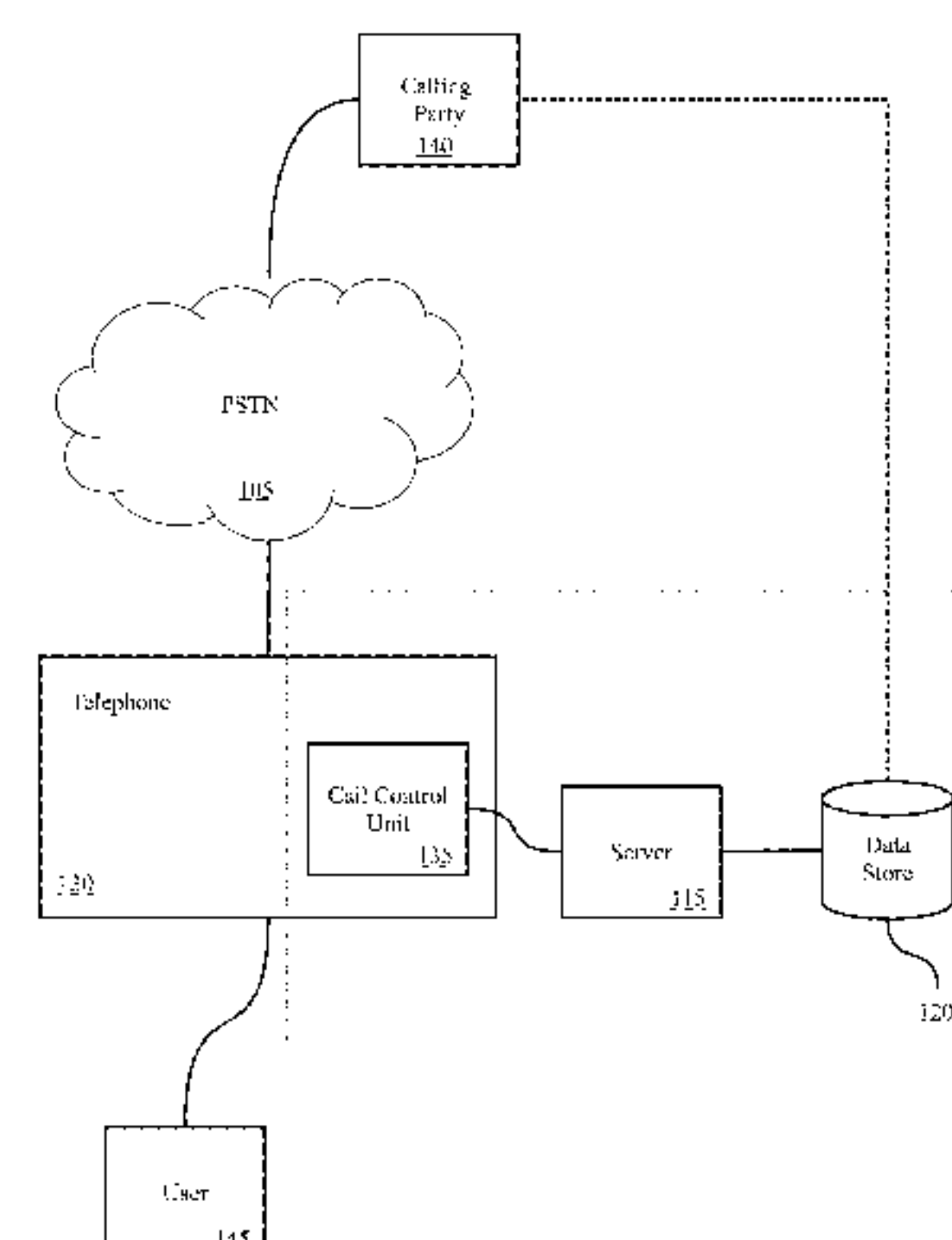
An indication of an incoming call may be received at a call control unit communicatively coupled to, and/or resident within, a telephone. The indication may include identification information for the incoming call. It may be determined whether additional information regarding a caller associated with the identification information exists, and if so, a first operation may be performed on the incoming call responsively to the additional information, otherwise, a second operation may be performed on the incoming call responsively to an absence of the additional information. The additional information may include a user-configurable list of desired callers (e.g., a whitelist) and/or undesired callers (e.g., a blacklist). The additional information may also include caller identification information and/or a spam score. The first operation may be blocking the incoming call, forwarding the incoming call to a voice mailbox, transmitting the incoming call to the telephone, enabling the telephone to receive the incoming call, and/or answering the incoming call and then terminating the incoming call. In some embodiments, the first and/or second operations performed on the incoming call is/are user configurable.

**18 Claims, 14 Drawing Sheets**

100



101







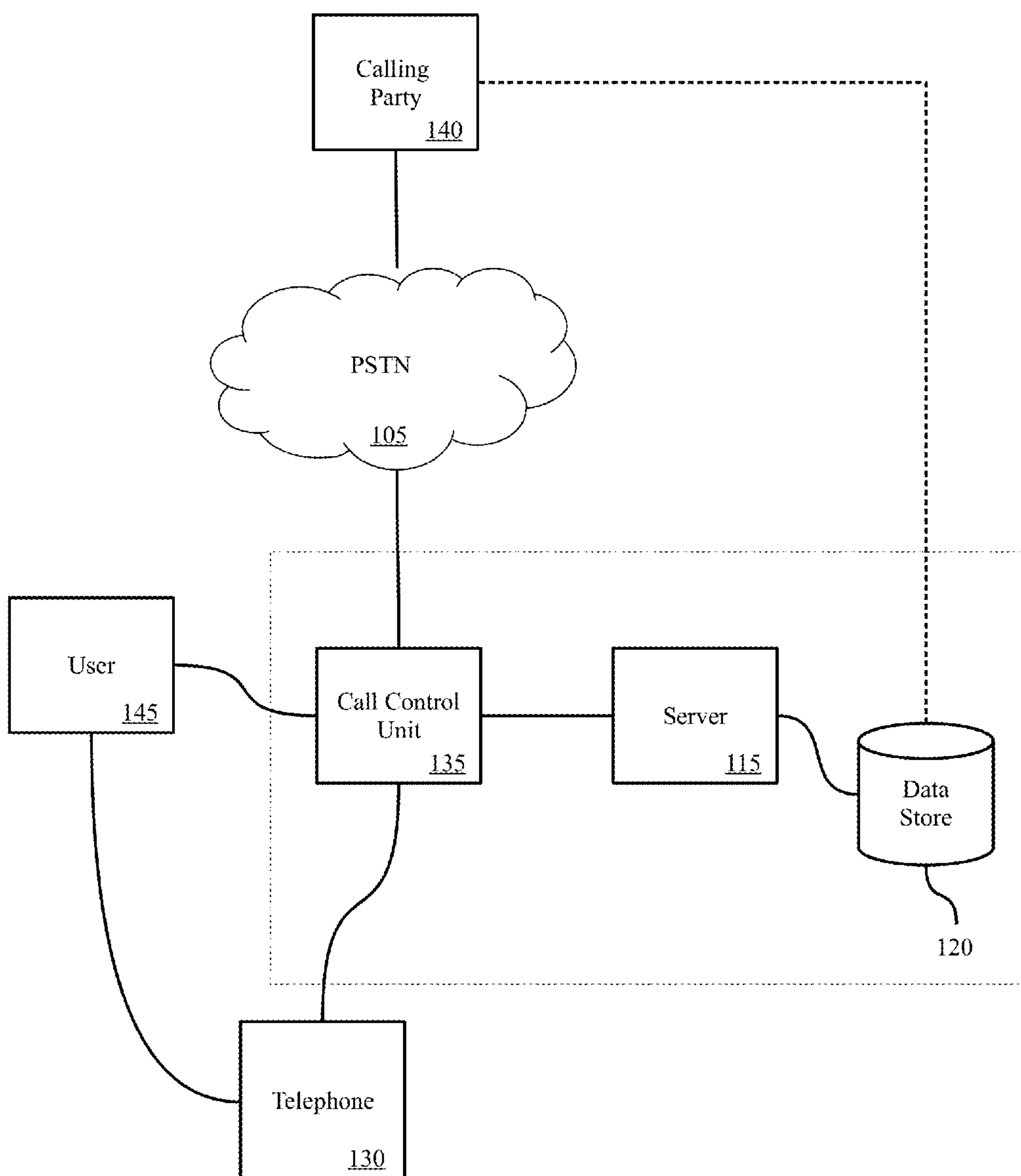
100

Figure 1A

101

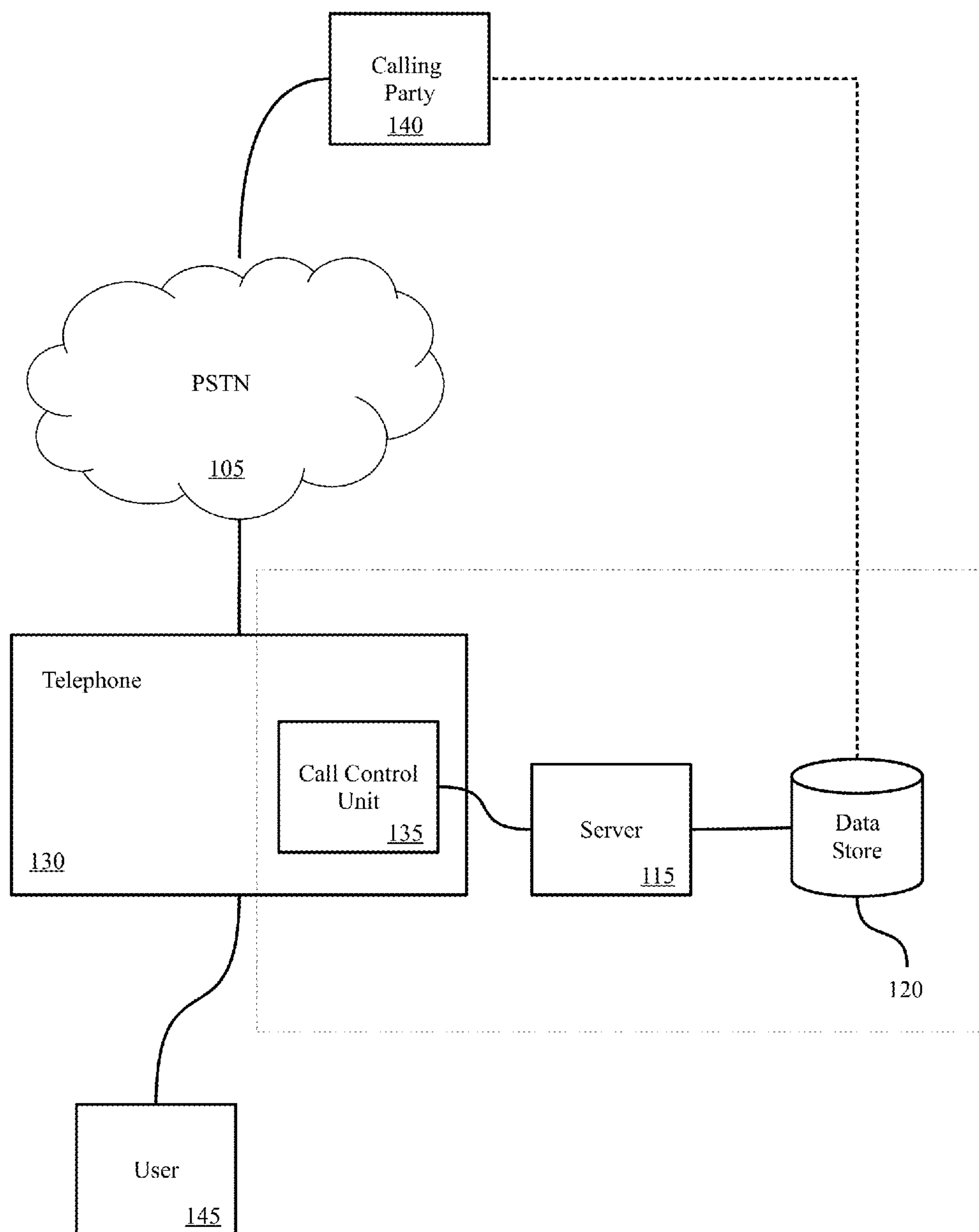


Figure 1B

200

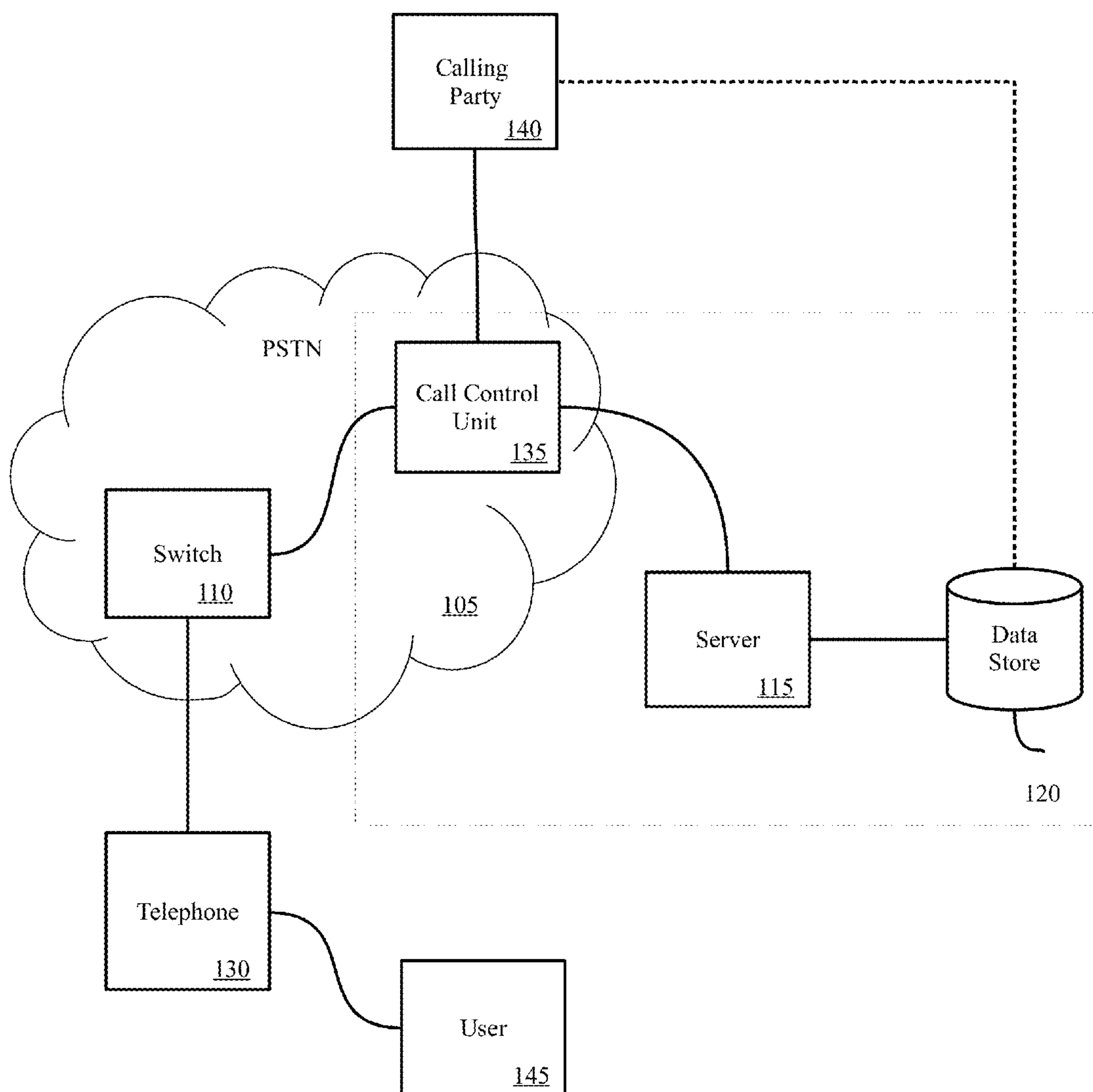


Figure 2



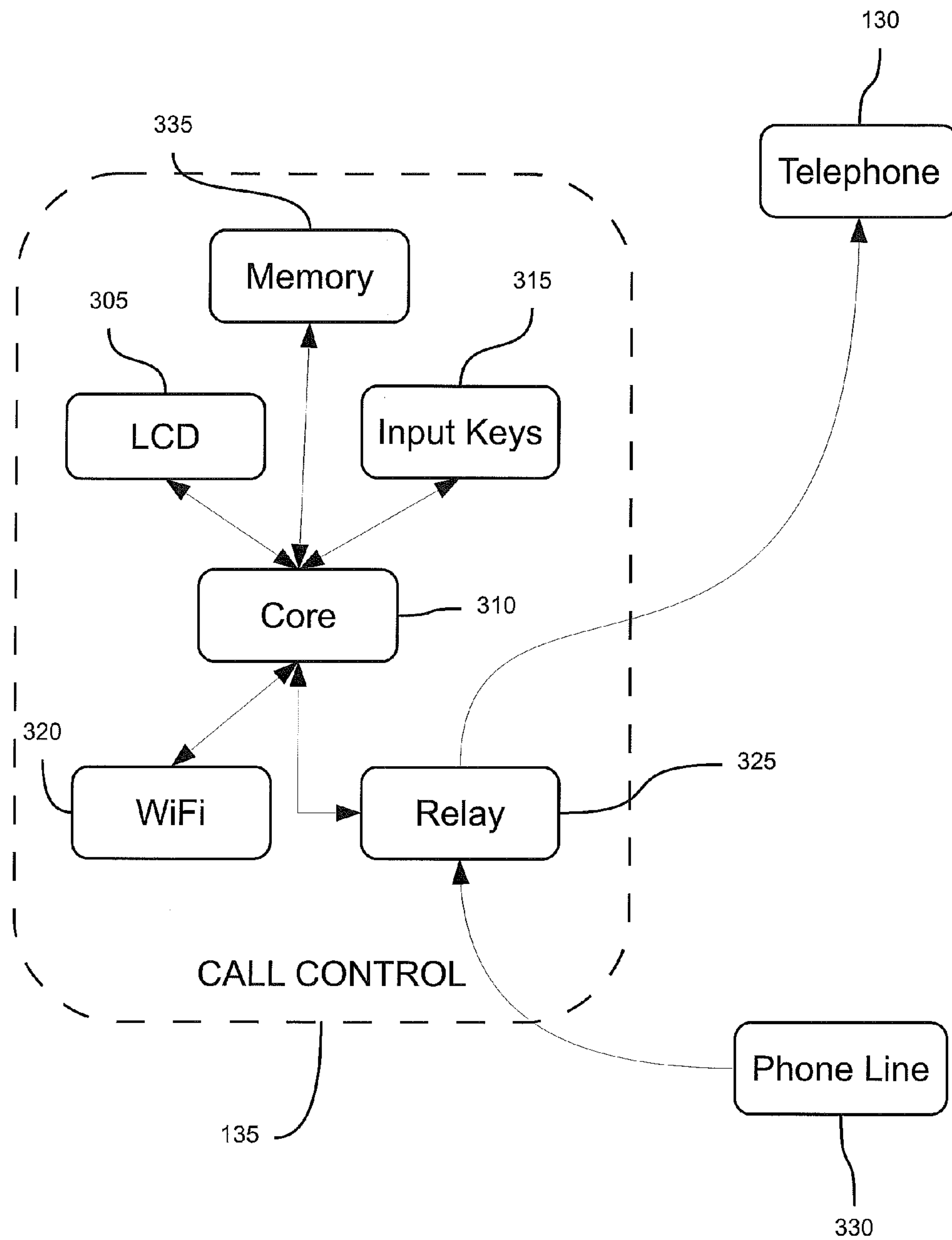


Figure 3

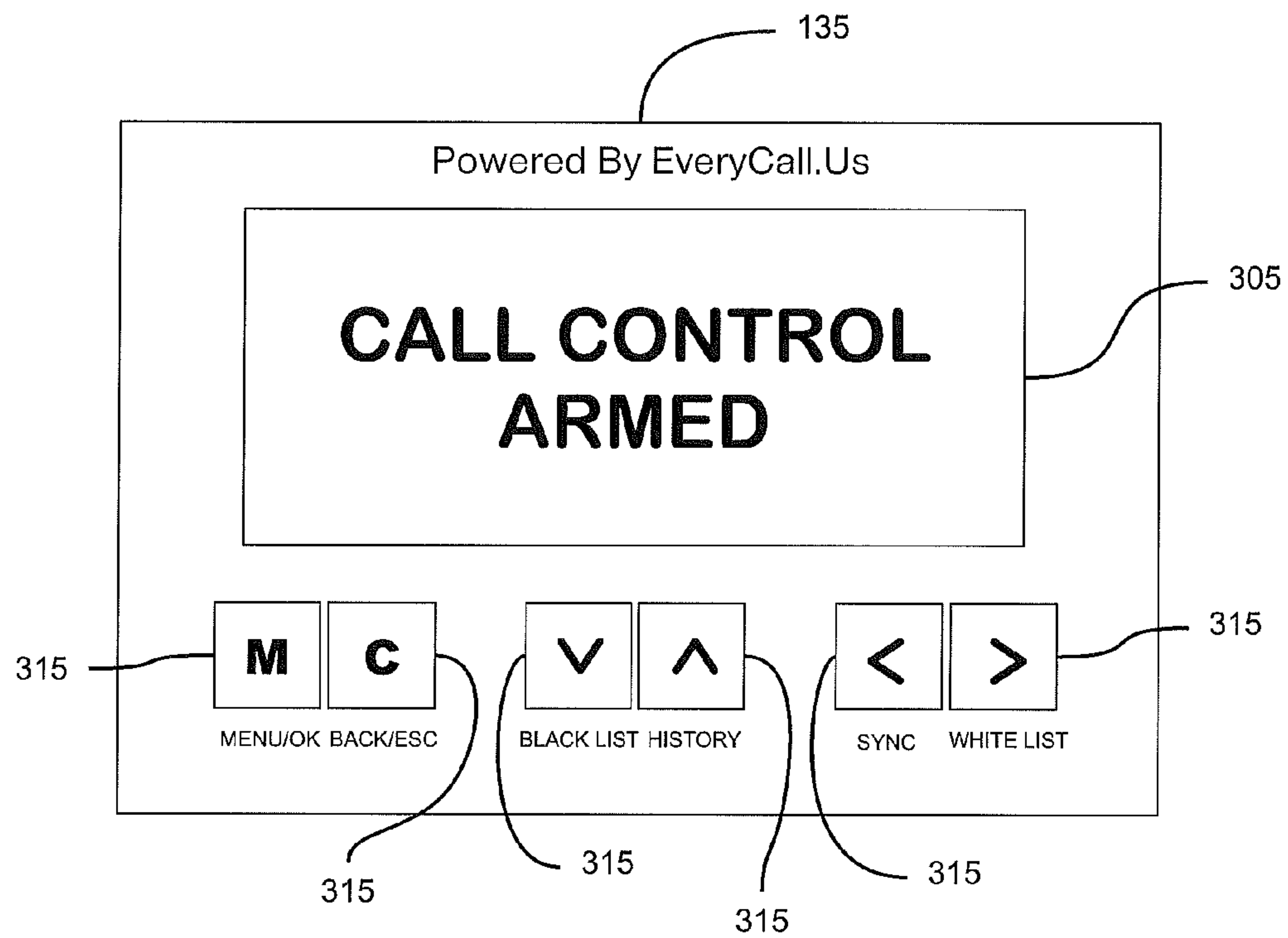


Figure 4



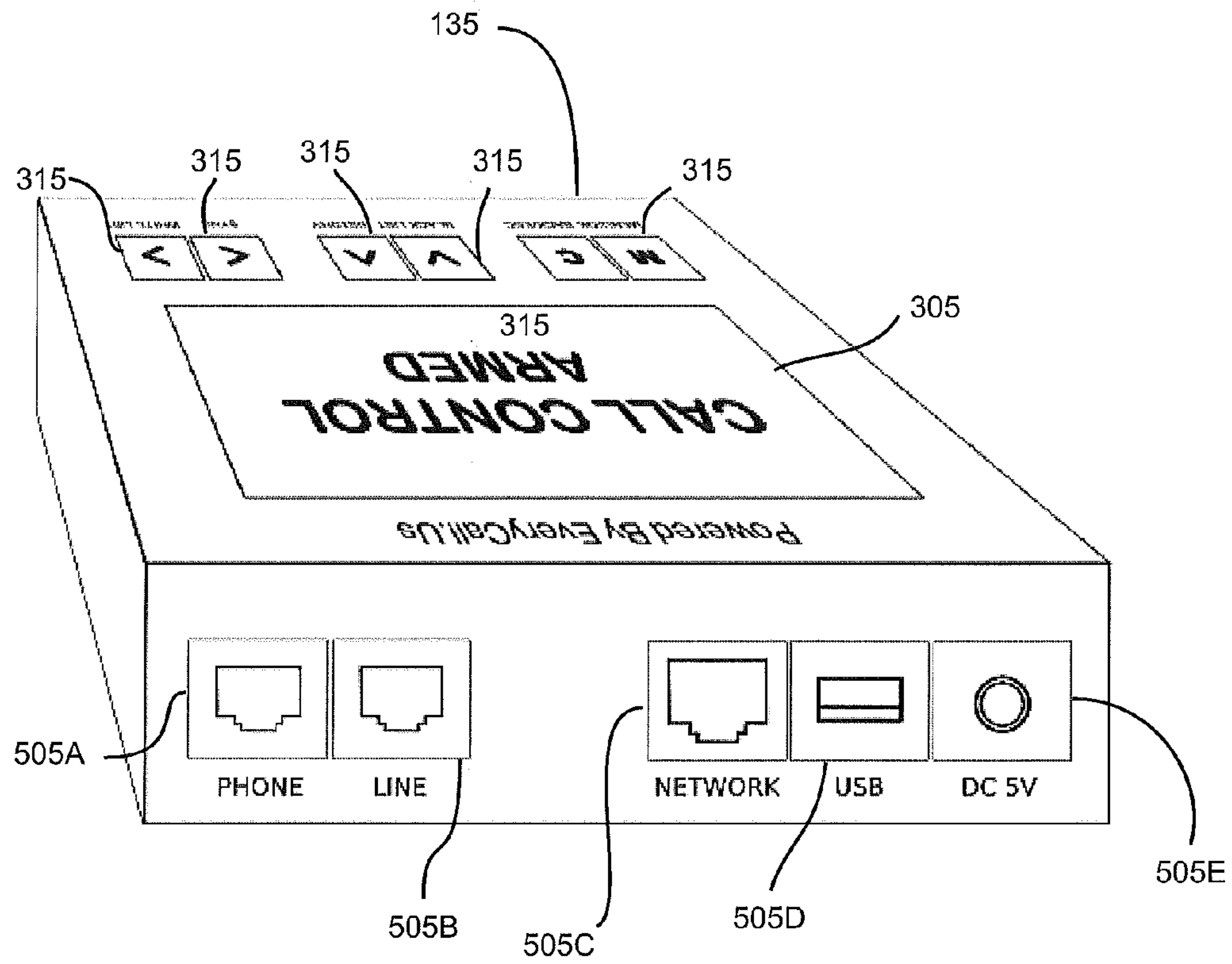


Figure 5

305

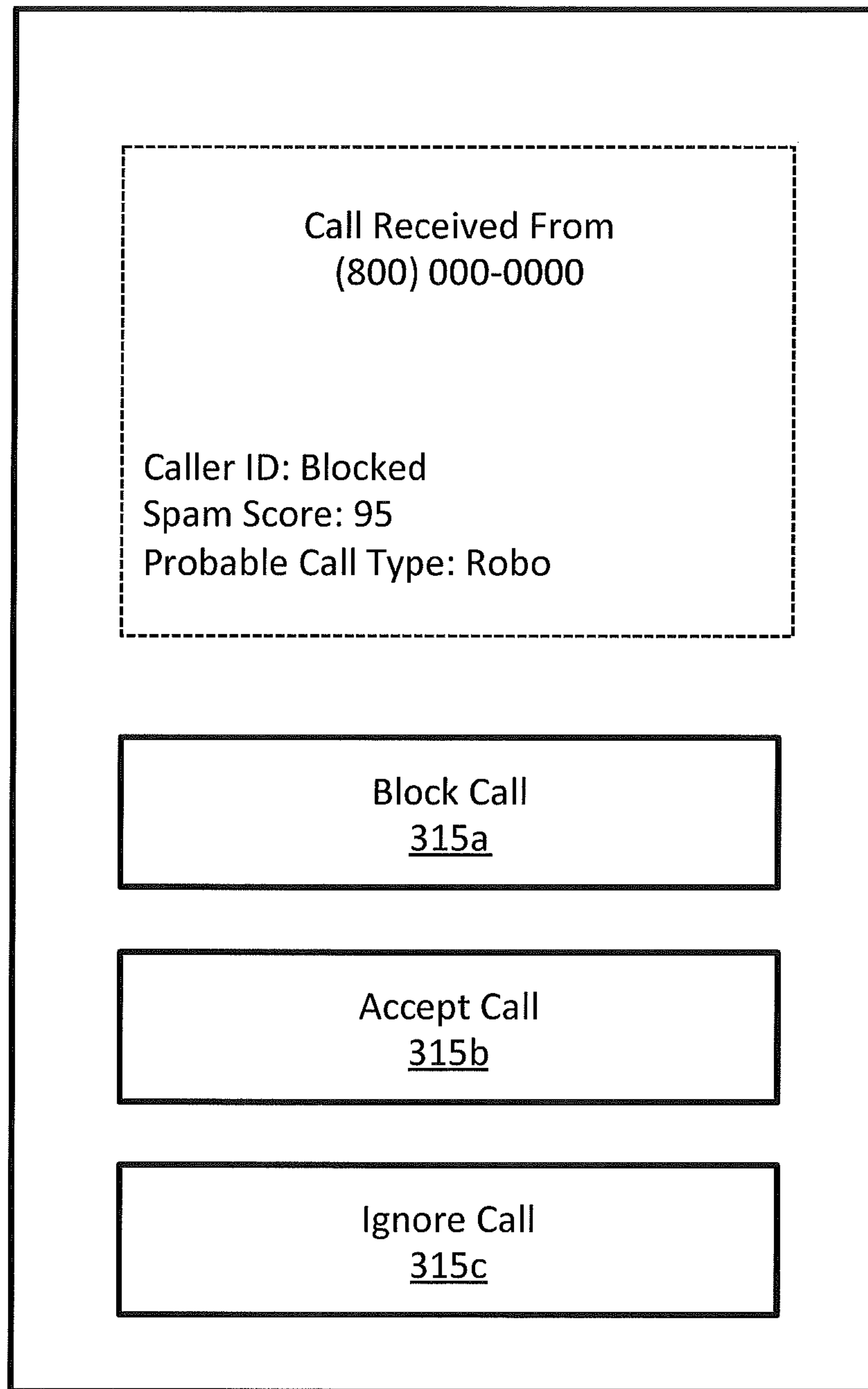


FIG. 6

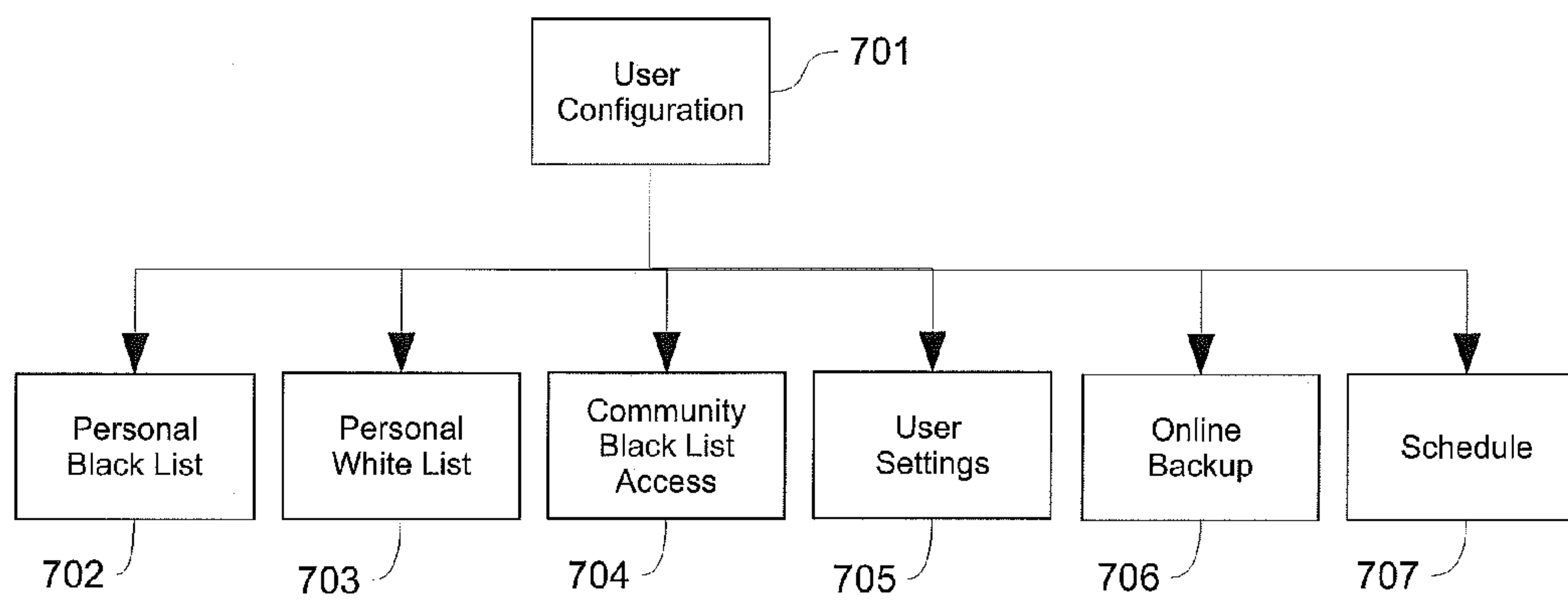


Figure 7



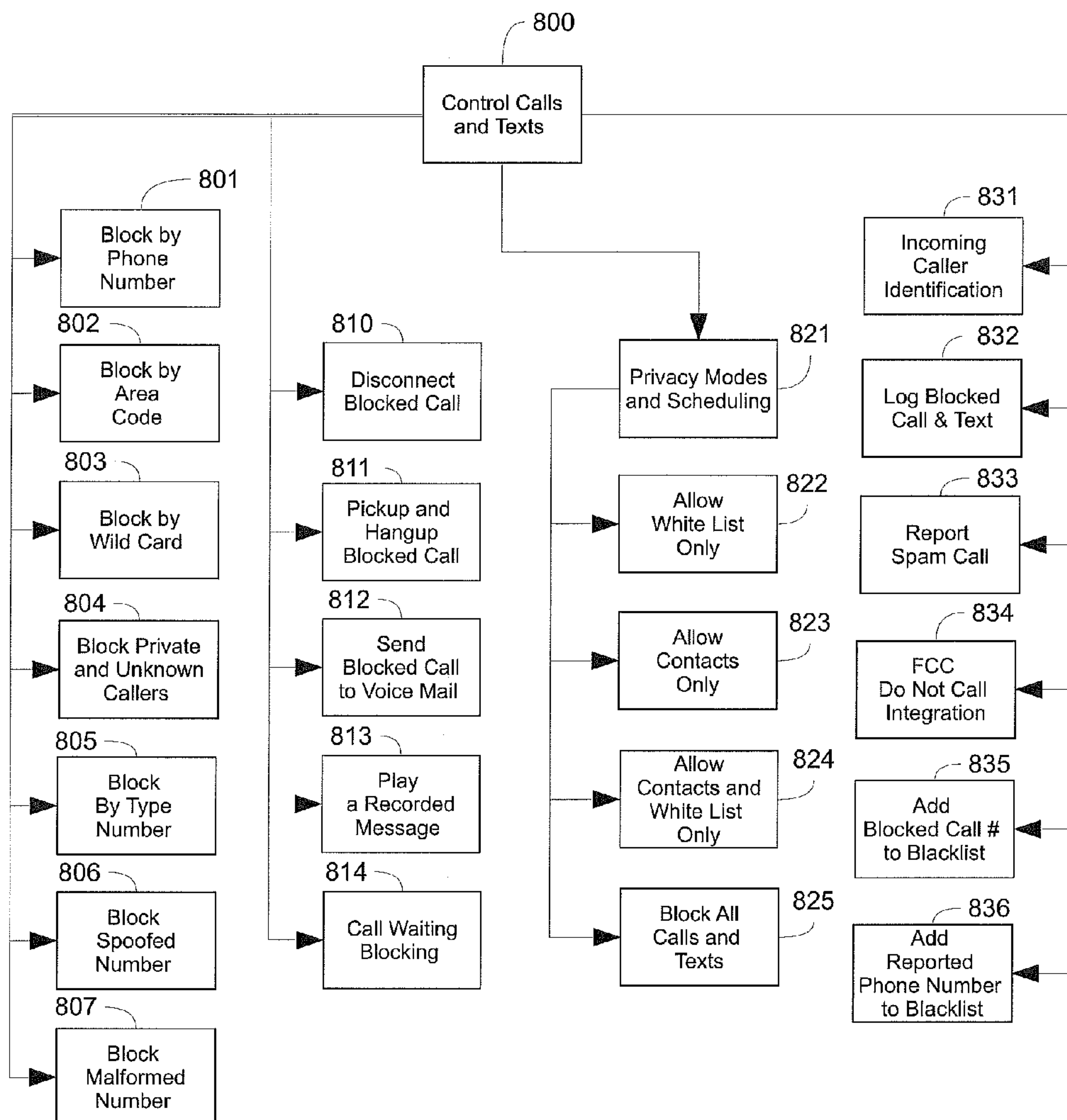


Figure 8

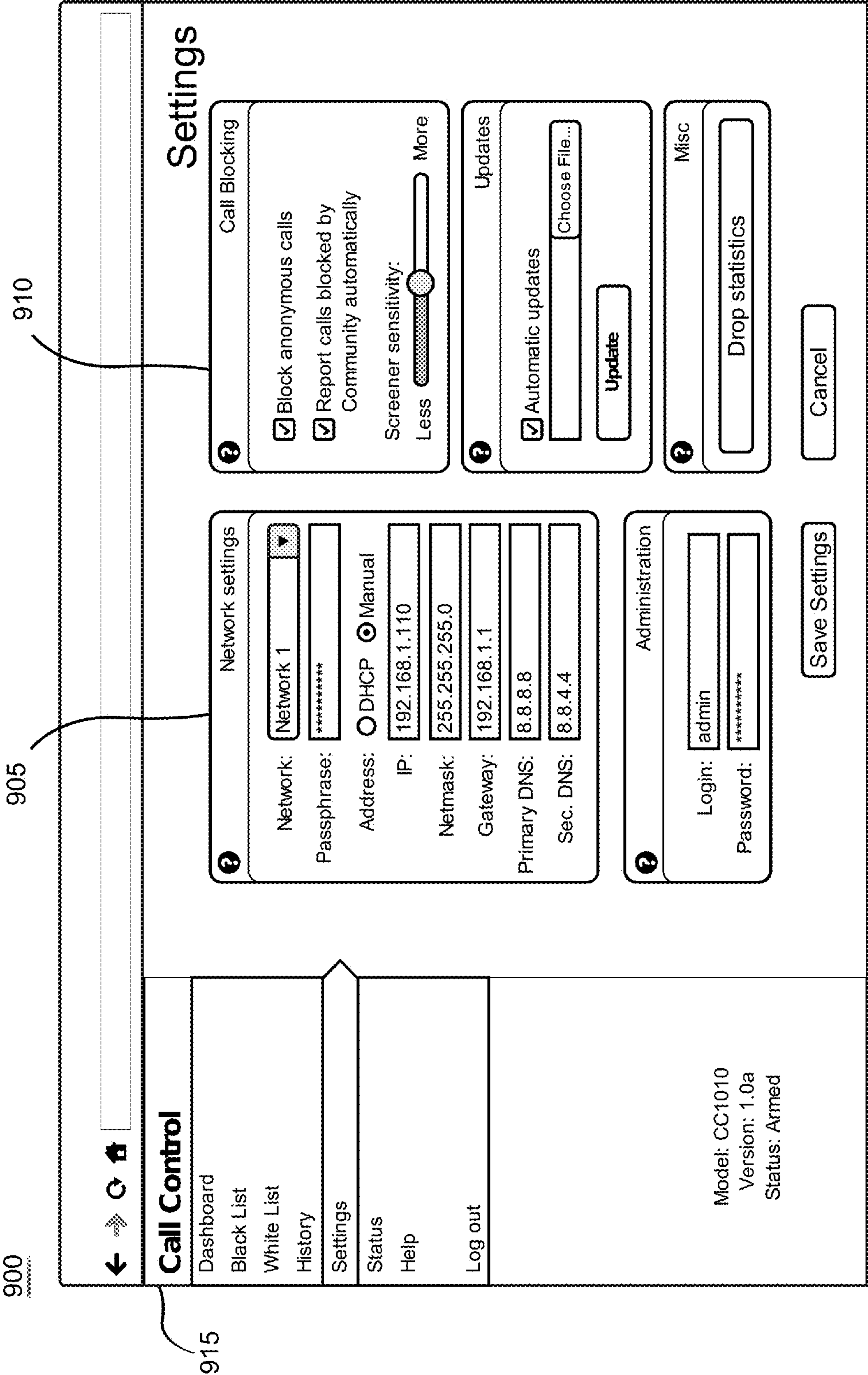
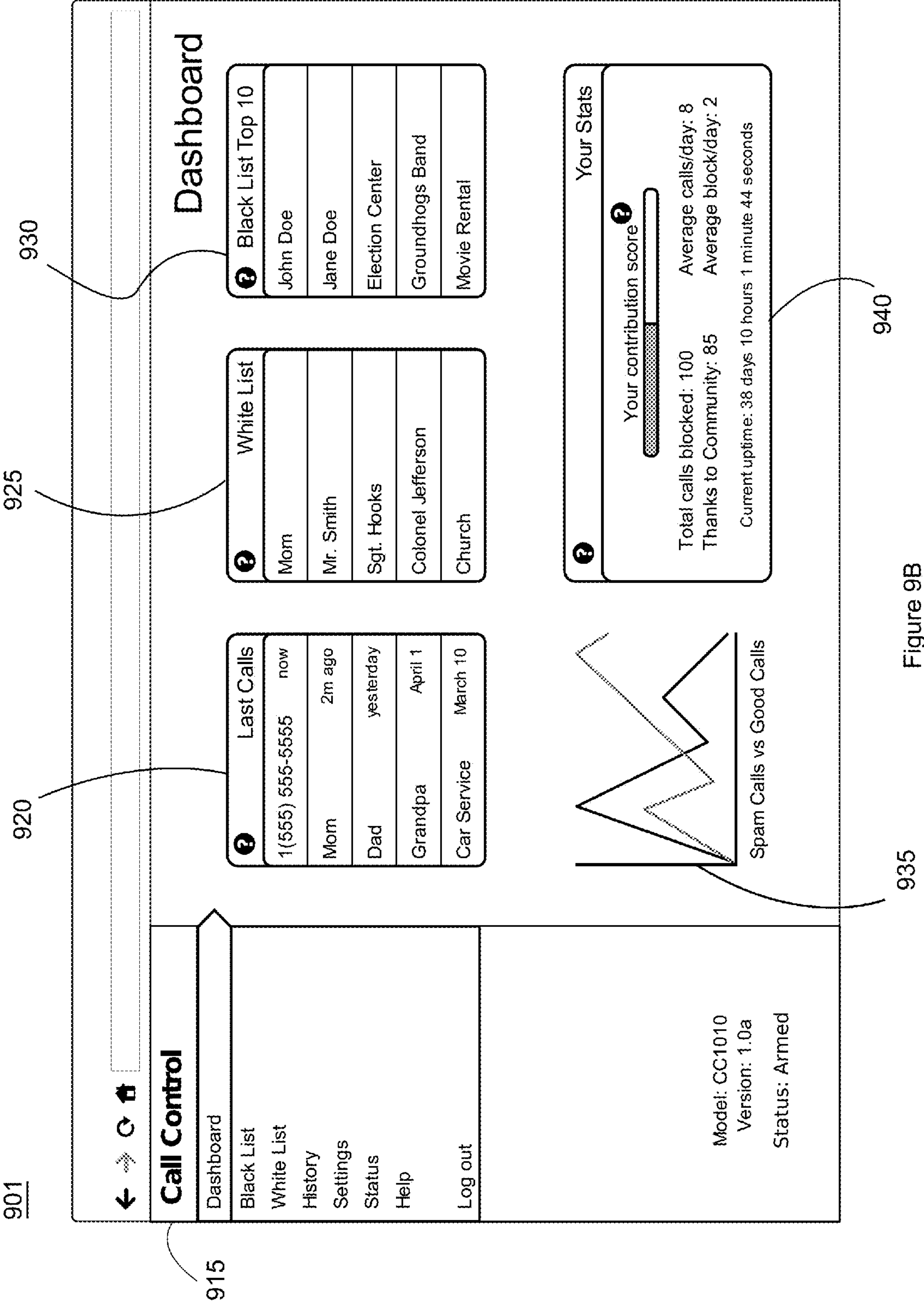


Figure 9A







1000

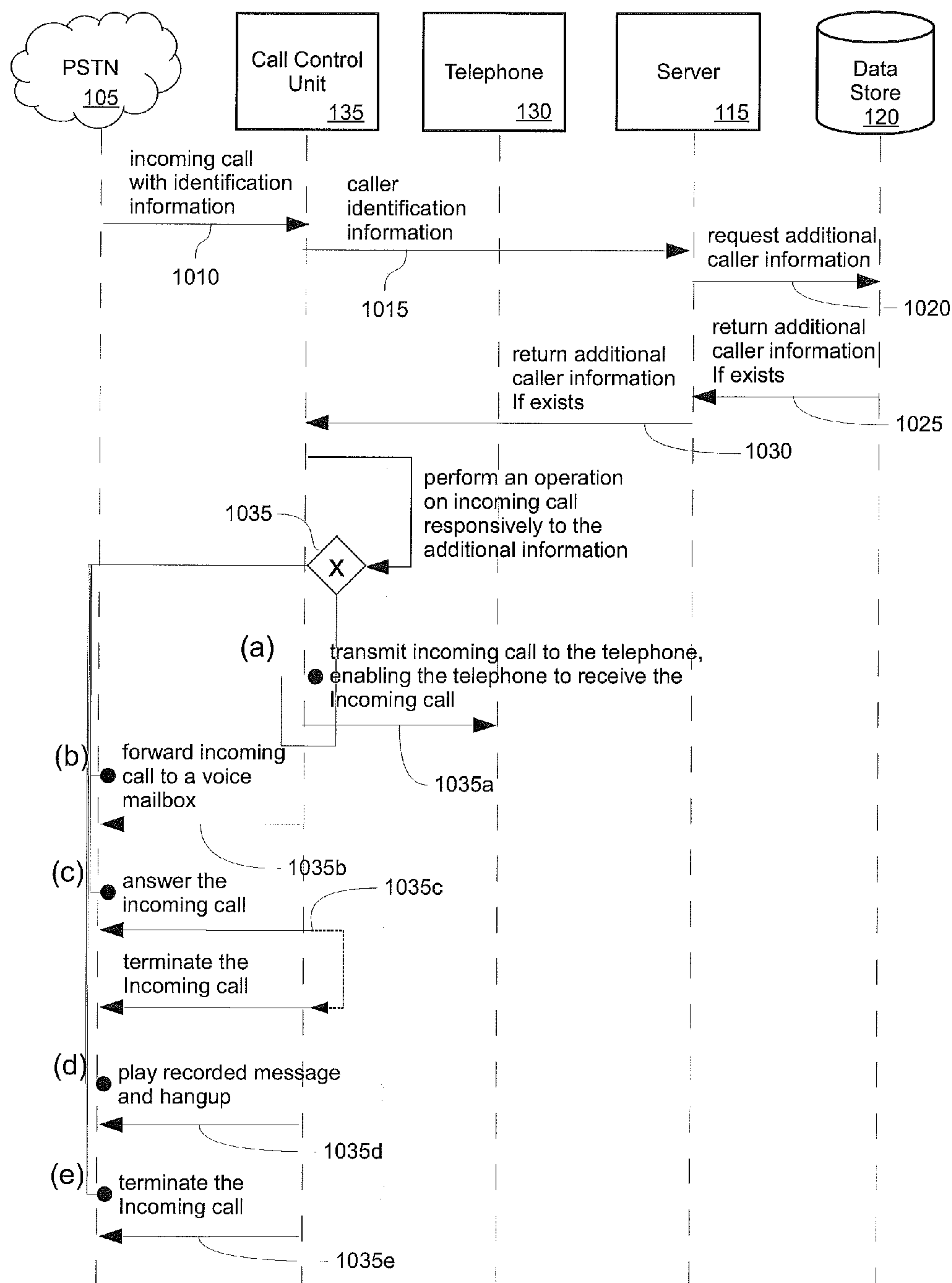


Figure 10

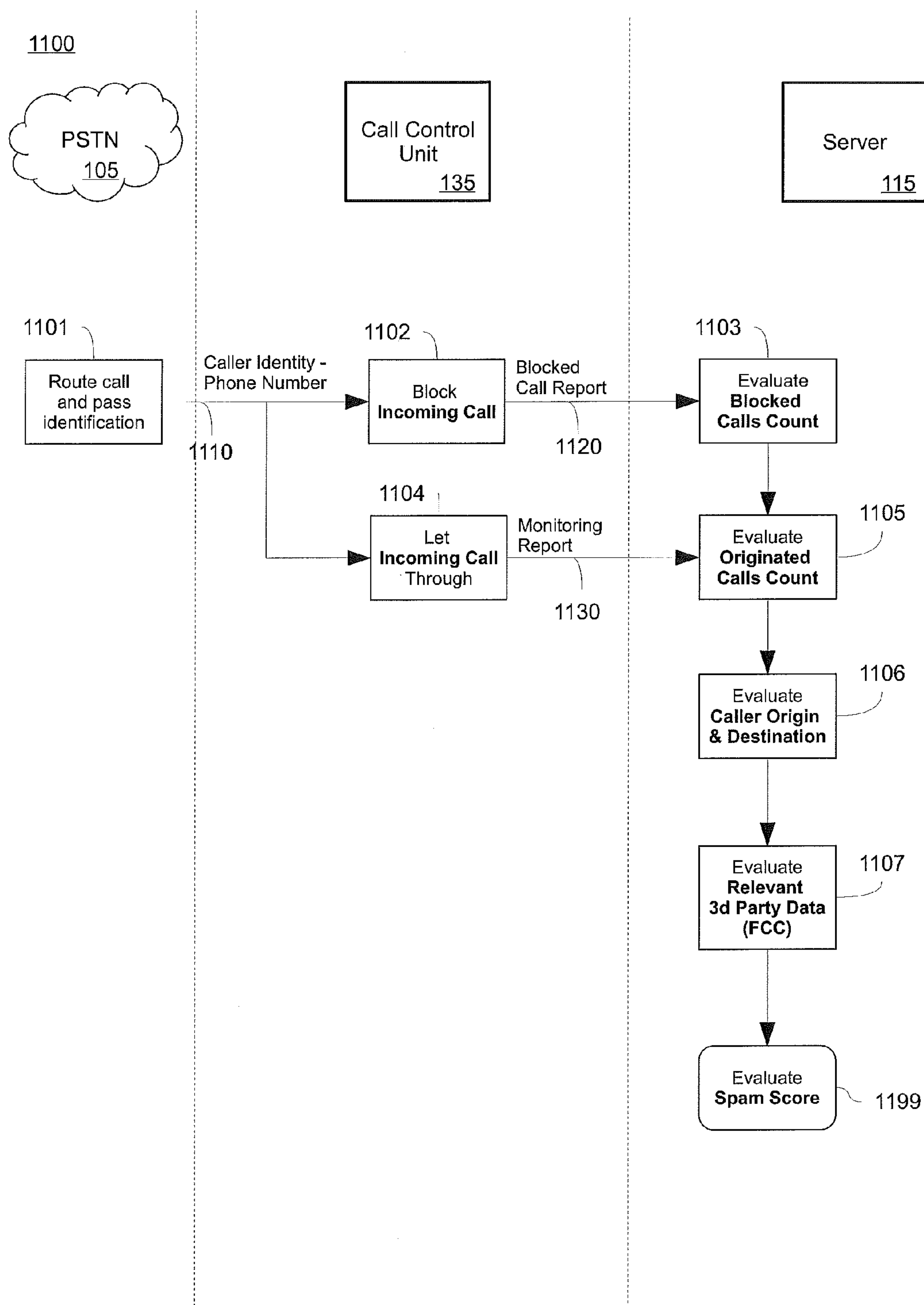


Figure 11

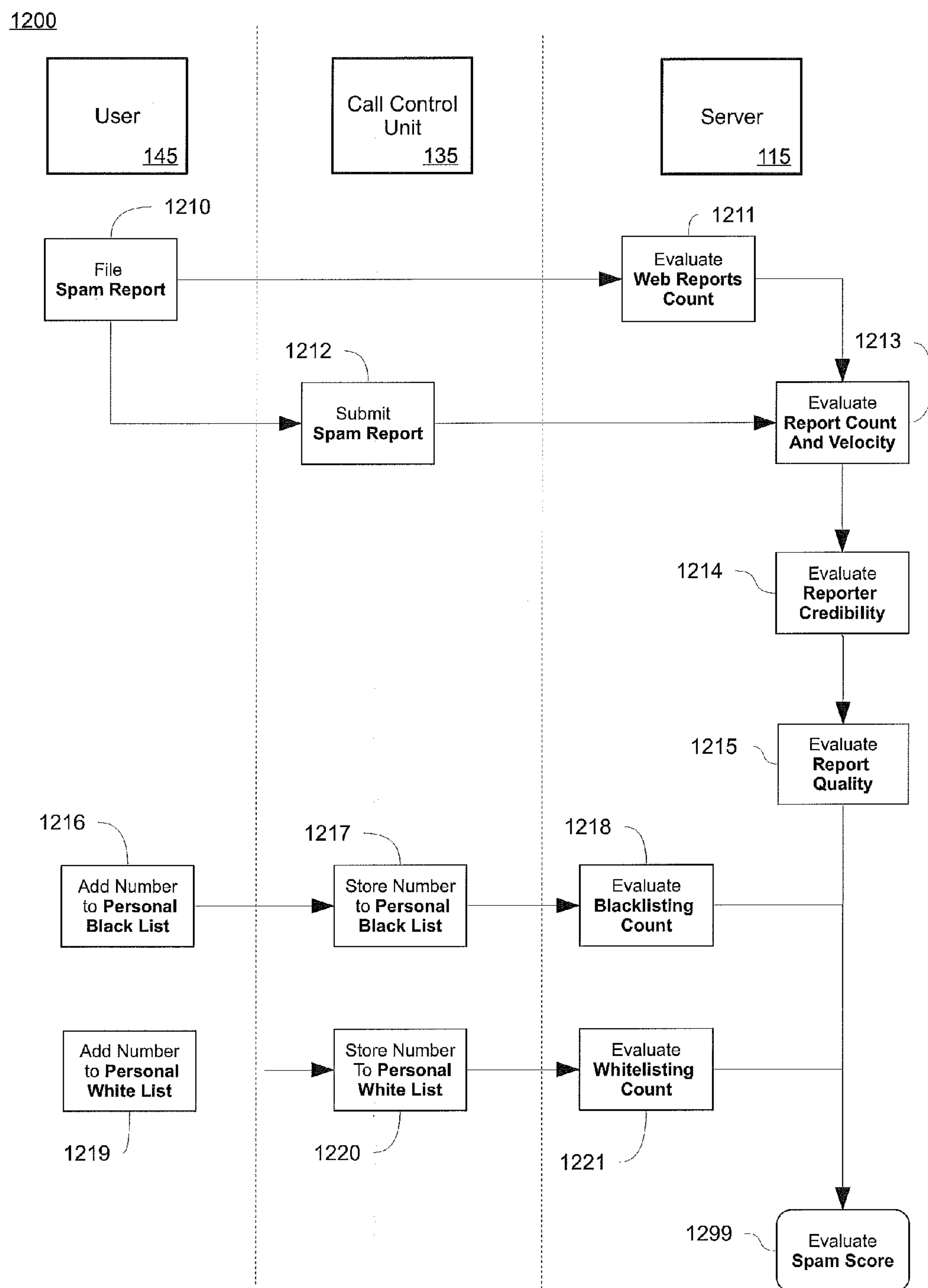


Figure 12



## US 9,491,286 B2

1

**METHODS AND SYSTEMS FOR INBOUND  
CALL CONTROL**

## RELATED APPLICATION

This application is a CONTINUATION of U.S. application Ser. No. 14/038,396 filed 26 Sep. 2013 which is a NON-PROVISIONAL of and claims priority to U.S. Application No. 61/715,076, filed 17 Oct. 2012, the contents of each are incorporated herein by reference.

## FIELD OF INVENTION

The present invention relates to methods and systems for controlling inbound calls and, more particularly, relates to methods and systems for evaluating inbound calls according to one or more criterion.

## BACKGROUND

Unsolicited and unwanted telephone calls, so-called “telemarketing” or “spam” calls, are received by thousands of people every day at, for example, their residence and/or workplace. The volume of unsolicited and unwanted telephone calls placed has increased dramatically in recent years with the advent of computer dialed “robocalls” which are able to call millions of telephone subscribers in a short period of time at minimum expense. Such calls are an unwelcome intrusion into privacy of the called party. The annoyance caused by spam calls has prompted the Federal Trade Commission (FTC) and Federal Communications Commission (FCC) to generate a “Do Not Call” registry of phone numbers associated with individuals who do not want to receive telemarketing calls and telemarketers are prohibited from calling numbers placed on the Do Not Call registry. The FTC recently hosted a robocall summit with industry stakeholders to help identify solutions to this growing problem.

## SUMMARY

Methods, devices, and systems for controlling inbound telephone calls are herein described. An indication of an incoming call may be received at a call control unit communicatively coupled to a telephone. The indication may include identification information for the incoming call. It may be determined whether additional information regarding a caller associated with the identification information exists, and if so, a first operation may be performed on the incoming call responsively to the additional information, otherwise, a second operation may be performed on the incoming call responsively to an absence of the additional information. The additional information may include caller identification information and/or a spam score. The first operation may be blocking the incoming call, forwarding the incoming call to a voice mailbox, transmitting the incoming call to the telephone, enabling the telephone to receive the incoming call, and/or answering the incoming call and then terminating the incoming call (disconnecting the call), to name a few. In some embodiments, the first and/or second operations performed on the incoming call is/are user configurable.

In some embodiments, determining whether additional information regarding a caller is associated with the identification information exists may be performed at the call control unit using information retrieved from a locally accessible data store. In other embodiments, determining

2

whether additional information regarding a caller associated with the identification information exists may comprise forwarding the identification information from the call control unit to a server. The server may be operative to determine whether the additional information regarding a caller associated with the identification information exists. When the additional information exists, the server may receive the additional information regarding the caller associated with the identification information, otherwise an indication that no additional information exists may be received from the server.

In some embodiments, an indication that the incoming call is undesired may be received at the call control unit and the call control unit may communicate the indication to a server. In some instances, the additional information may include a user-configurable list of desired and/or undesired callers and the identification information for the undesired incoming call may be automatically added to the user-configurable list of undesired callers.

## BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example, and not limitation, in the figures of the accompanying drawings in which:

FIGS. 1A, 1B, and 2 are block diagrams of exemplary systems, consistent with an embodiment of the invention;

FIG. 3 is a block diagram depicting an exemplary call control unit, consistent with an embodiment of the invention;

FIGS. 4 and 5 are block diagrams depicting exemplary call control units, consistent with an embodiment of the invention;

FIG. 6 is a block diagram depicting an exemplary display/LCD, consistent with an embodiment of the invention;

FIG. 7 depicts exemplary settings for a call control unit, consistent with an embodiment of the invention;

FIG. 8 is a diagram depicting a series of actions call control unit, consistent with an embodiment of the invention;

FIGS. 9A and 9B illustrate exemplary user interfaces, consistent with an embodiment of the invention; and

FIGS. 10-12 depict processes, consistent with an embodiment of the invention.

Throughout the drawings, the same reference numerals and characters, unless otherwise stated, are used to denote like features, elements, components, or portions of the illustrated embodiments. Moreover, while the subject invention will now be described in detail with reference to the drawings, the description is done in connection with the illustrative embodiments. It is intended that changes and modifications can be made to the described embodiments without departing from the true scope and spirit of the subject invention as defined by the appended claims.

## Written Description

Described herein is an exemplary platform and technology for performing intelligent operations on inbound calls, for example, landline and/or VOIP telephone calls to a called phone number. The present methods and systems may be employed in the case of voice calls, text messages and/or other inbound communications to the called phone number. For ease of discussion, throughout the following description, such attempts to contact a user shall be referred to as calls or phone calls. It should be understood that this is not intended to limit the scope of the invention in any way.

Exemplary operations performed on calls include blocking, rejection, redirection (e.g. to a voice mail box or



## US 9,491,286 B2

## 3

automated message), identification, and an application of privacy controls to an incoming call. The operations may be applied to incoming calls at, for example, the device level (e.g., via a call control unit resident internally or externally to a phone to which an incoming call is directed) and/or at a network or PSTN level.

The present systems and methods source information concerning incoming call and text message activity from a plurality of users, e.g., mobile and landline telephone subscribers, to track activity of unwanted calls and messages (e.g., from spam callers or telemarketers) via, for example, a central database (running on, e.g., a web server) and/or through an API interface that provides a set of features including call blocking, individual blacklisting and white-listing of phone numbers or caller identifiers, caller identification, call reporting, and other customizable/user selectable features.

## Platform Overview

In one embodiment, the technology employs a web service (e.g., EveryCall.us) that sources call-related activity from a plurality of users and information sources. Users may provide call-related information via the Web, via mobile or landline communication devices, at the PSTN level via API or other means. Other information sources may exist at the network level, and/or may include public information e.g., the Federal Do Not Call Registry. In some embodiments, the web service may be located in a hosted environment and provide a secure and unique Application Program Interface (API) which enables a continual data connection between the platform and connected devices which may, in turn, be provided to the plurality of users.

## Community Blacklist

Some embodiments of the present invention may provide a community blacklist to users. The community blacklist is a database of identifiers (e.g., telephone numbers, text messaging numbers, and/or caller id name) and related information that is compiled using a proprietary algorithm that analyzes a large volume of call data reported from users and other sources of data to provide up to the minute information about active, unwanted and spam callers and text message senders. The result of this analysis may be a score, sometimes referred to herein as a “spam score.”

In some cases, the spam score represents a level of unwanted or spam activity originating from, or associated with, a given phone number or identifier. The score may be scaled using, for example, a scale of 0-100 with 100 being the maximum level of spam activity across the communication network for each identifier. This score is updated continually based on actual activity transpiring on the network.

The spam score algorithm uses, for example, a combination of the following data to identify active unwanted/spam callers who are then added to the community blacklist:

Report velocity (# of reports related to a phone number or caller identification information over a defined period of time).

Credibility of users reporting calls/texts/other unwanted communication. Credibility may be determined by, for example, tracking the credibility of each user based upon a number of factors including number of previously made reports, quality of reports, and number of votes from other users, etc.

Number of calls to users.

Number of users who have added the phone number to a private blacklist over a finite period of time.

Number of users who have added the phone number to a private whitelist over a finite period of time.

## 4

Number of calls blocked over a defined period of time.  
Number and velocity of reports.

Number of reports from public law enforcement entities such as the FCC Do Not Call registry or State Attorney Generals offices (obtained via, for example, Freedom of Information Act (FOIA) request directly from that agency).

The spam score for phone numbers, caller identification information, and related information that meet a minimum threshold (which may be user defined) are added to the community blacklist which is then transmitted to all connected devices (e.g., mobile, landline, network) on, for example, a real time, periodic, and/or as needed basis. An operation (e.g., call blocking, call forwarding, etc.) may then be applied to, for example, some or all incoming calls and/or text messages associated with community-blacklisted numbers/callers.

Calculation of a score in this manner prevents wrongfully adding non-spam/wanted phone numbers to the community blacklist, in part because it takes more than just one report, factor or element to pass the threshold and classify the number as spam. Calculation of the score in this manner may prevent, for example, a single user, or even a group of users, from wrongfully or maliciously adding numbers or contact information to the community blacklist.

In some embodiments, the community blacklist is continually calculated and updated based on received information. This may be done in real time or on a periodic or continuous basis. In this way, the information on the community blacklist is kept current and when a calculated score for a particular phone number or caller identification no longer meets the threshold, it is removed from the community blacklist and those calls are no longer blocked/operated upon across the platform.

## Call Control Landline Device (Landline)

The present invention may be instantiated, in part, in a call control unit **135** as part of exemplary systems **100**, **101**, and **200** as depicted in FIGS. 1A, 1B, and 2, respectively. Call control unit **135** may reside within various components of a system and/or may exist as a stand-alone hardware device. For example, call control unit **135** may be configured to be a stand-alone hardware device communicatively connected between a landline or analog telephone **130** and telephone communication network, such as the public switched telephone network (PSTN) **105** as in system **100** of FIG. 1A or may reside in telephone **130** as depicted in system **101** of FIG. 1B. Call control unit **135** may also be a component of PSTN **105** as in system **200** of FIG. 2.

Call control unit **135** may perform one or more operations on incoming calls to the telephone **130**. For example, in response to receipt of an inbound call from a calling party **140**, the call control unit **135** may communicate with a server **115** that provides information associated with calling party **140**, such as the community blacklist (stored on, for example, a data store **120**), and/or a user's personal whitelist and blacklist of phone numbers. In FIG. 1, this communication is shown as occurring over PSTN **105**; however, in other embodiments a separate data network connection may be used. Upon receipt of the information from server **115**, call control unit **135** may perform one or more operations on the incoming call, as described further below.

Call control unit **135** may be user configurable and the user configuration data may be stored, for example, on a data store resident within call control unit **135**, on server **115**, and/or data store **120**. Exemplary user configurations include generation and maintenance of a personal blacklist and/or whitelist of phone numbers or various operations to



## US 9,491,286 B2

## 5

be performed upon an incoming call based upon, for example, identification information associated with calling party **140**. A whitelist of phone numbers may include contact information or phone numbers associated with people/entities the user always wants to receive a phone call from.

User **145** may directly configure call control unit **135** via, for example, a user interface (e.g., buttons or touch screen). User **145** may also configure call control unit **135** via user's phone **130** or via another interface (e.g., a computer or mobile communication device) communicatively coupled to call control unit **135** (e.g., via PSTN **105** or a separate data communication network). Such coupling may be indirect, for example, via a web services interface (e.g., provided by server **115**) in which configuration information is specified and later downloaded to call control unit **135**. In some embodiments, user **145** may report phone numbers or caller identification information to, for example, server **115** for inclusion in the community blacklist, which may automatically add that caller to the users personal blacklist.

On some occasions, call control unit **135** may be enabled to provide caller identification information to user **145**. This identification information may be retrieved from, for example, data store **120**. This identification information may be provided in addition to, or instead of, traditionally available caller identification information (e.g., an ANI).

User **145** may also customize the operations performed on an incoming call-by-call control unit **135** according to one or more criteria. For example, the user may configure call control unit **135** to automatically terminate or forward to an automatic message all attempts to communicate with user **145** from callers included on the personal and/or community blacklist.

Other exemplary operations that may be performed by call control unit **135** include:

Generation and maintenance of a personal blacklist and whitelist of phone numbers and caller identification information.

Block by area code and wildcards (e.g. 888-237-????). Incoming Caller Identification (e.g., call type (telemarketing, survey, junk fax, debt collection, etc.) or caller name.

Spam call reporting.

Online backup of settings and lists—restored in the case of device is lost or damaged.

Blocked call/message log.

Block Private, Unknown, Restricted, Unavailable Callers.

Privacy Modes and Scheduling

Allow whitelist only.

Allow contacts only.

Allow contacts and whitelist only.

Block all calls and texts.

Community Blacklist

FCC Do Not Call or other government agency integration

Call waiting blocking

The call control unit **135** may intercept incoming calls that are on either the community or personal blacklist (and not on the whitelist) and may perform one or more of the following operations on the incoming call:

Briefly answer the call and hang-up i.e., pick-up and hang-up or disconnect.

Withhold the call via hardware relay.

Send to voicemail.

Play a recorded message.

Modify ring to special ring.

Display enhanced caller id (e.g. "Spam Call").

## 6

In many cases the operation may be performed automatically without user's **145** direct knowledge or the ringing of phone **130**.

Call Control for Networks (Networks)

The present invention also provides a system for performing operations on calls or attempts to contact user **145** at a network level as shown in system **200** of FIG. **2**. In this instance, the operations performed by call control unit **135** may be performed by a call control unit **135** and a switch **110** operating together within, for example, PSTN **105**. Call control unit **135** and switch **110** may communicate with server **115** and data store **120** to perform some, or all, of the operations discussed herein at the network level. In this embodiment, the calls or attempts to communicate with user **145** may be operated upon as a service level integration whereby a telephone service provider (e.g., VoIP, analog/traditional, wireless) connects with server **115** and/or data store **120** to obtain information from the platform (e.g., community blacklist, spam score, caller name, report information, ability to submit reports, etc.) in order to provide customized services to the telephone service provider's customer base. It is important to note that in this embodiment, calls are intercepted at the network level thereby eliminating the requirement for any device or software to be implemented or installed by the user.

In summary, upon receiving an indication of an incoming call, a call control unit that is communicatively coupled to a telephone, forwards identification information for the incoming call to a server (or other computer system). The server is operative to determine whether additional information regarding a caller associated with the identification information exists, and, if so, provides same to the call control unit (in some instances, if no such additional information exists, the server sends a response indicating same). Based on and responsive to the information returned from the server (or lack of such information), the call control unit performs an operation on the incoming call. Such an operation may include blocking the incoming call, forwarding the incoming call to a voice mailbox, transmitting the incoming call to the telephone, enabling the telephone to receive the incoming call, and/or answering the incoming call and then terminating the incoming call. Either or both of the operation to be performed and the additional information stored by the server may be user-configurable. In addition, it is important to note that communication between the components of systems **100** and **200** may be facilitated via wired and/or wireless communicative couplings and, in some instance, may take place over a communication network, such as the Internet.

FIG. **3** is a block diagram depicting an exemplary call control unit **135**. Exemplary call control unit **135** includes a display or LCD **305**, a user interface or input keys **315**, a Wi-Fi transceiver **320**, a memory **335**, and a telephone relay **325**, all of which may be coupled to a processor core **310**. Display or LCD **305** may be any appropriate display device and, in some cases, may be a touch-enabled display. Display or LCD **305** may be configured to display information to a user, such as user **145**. Display or LCD **305** may be further configured to receive information from a user, such as user **145**, when configured, as is a touch-enabled display. Memory **335** may be configured to store sets of instructions, which when executed by processor core **310**, perform one or more of the processes described herein. In addition, memory **335** may record actions executed by call control unit **135** (e.g., call blocking or transmission of spam reports), user configuration settings, and/or a user's blacklist and/or whitelist.



## US 9,491,286 B2

## 7

User interface or input keys **315** may be any configuration of input keys (e.g., alpha-numeric, pictographic, and/or arrow keys) by which a user, such as user **145**, may input information into call control unit **135**. Processor core **310** may be any appropriate processor enabled to execute one or more processes described herein and may control the operation of one or more components of call control unit **135**. In some embodiments, processor core **310** may include 64 MB of RAM and 128 MB of re-writable storage. Wi-Fi transceiver **320** may be configured to enable call control unit **135** to communicate with one or more components of system **100** and/or **200**. In some embodiments, call control unit **135** maybe communicatively coupled to PSTN **105** via a phone line **330** and may receive incoming calls at relay **325** via phone line **330**. Relay **325** may be configured to transfer an incoming call to telephone **130** responsively to, for example, instructions from processor core **310**. In some embodiments, relay **325** may physically connect phone line **330** to telephone **130**. In many cases, the default position for relay **325** will be closed. When a call is received by relay **325** via phone line **330**, relay **325** may open thereby preventing telephone **130** from receiving the call until processor core **310** determines whether the incoming call should be transferred to telephone **130**. When processor core **310** determines that the incoming call should be transferred to telephone **130**, processor core **310** may transmit a command to close to relay **325**, which, upon receipt, closes relay **325** thereby enabling the incoming call to be connected to telephone **130**. When processor core **310** determines that the incoming call should not be transferred to telephone **130**, processor core **310** may transmit a command to keep relay **325** open, which, upon receipt, opens relay **325**, or maintains a previously open position, thereby blocking the incoming call from being connected to telephone **130**. Alternatively, when relay is maintained in an open position and an incoming call is received that processor core **310** determines should not be connected to telephone **130**, processor core **310** may do nothing, thereby maintaining the open position of relay **325**.

FIG. **4** is a block diagram depicting a top plan view of an exemplary call control unit **135** including display/LCD **305** and multiple input keys **315**. FIG. **5** is a side perspective view of an exemplary call control unit **135** including display/LCD **305** and multiple input keys **315**, and multiple ports **505<sub>A-E</sub>**. Multiple ports **505<sub>A-E</sub>** may be uni- or bi-directional. Exemplary ports **505<sub>A-E</sub>** include phone jack **505<sub>A</sub>**, line in **505<sub>B</sub>**, network connection **505<sub>C</sub>**, USB port **505<sub>D</sub>**, Ethernet ports, and power port **505<sub>E</sub>**.

FIG. **6** is a block diagram depicting display/LCD **305** and multiple input keys **315<sub>a-c</sub>**, wherein display/LCD **305** is a touch-enabled display and multiple input keys **315<sub>a-c</sub>** are provided via the touch-enabled display. Selection of input key **315<sub>a</sub>** may enable a user to block a call and, on some occasions, when input key **315<sub>a</sub>** is selected, a blocked call report may be sent to, for example, a server such as server **115**. As can be seen in FIG. **6**, display/LCD **305** may be enabled to display information regarding an incoming call, such as call type, a spam score, a phone number, and a name associated with the caller.

Call control unit **135** may be preprogrammed with default settings and, in some instances, may be user configurable. FIG. **7** depicts some of the settings for call control unit **135** that may be user configurable **701** by a user, such as user **145**. For example, a user may configure a personal blacklist **702** and/or a personal whitelist **703** of phone numbers and/or contact information. The user may establish a preferred configuration for accessing a community blacklist **704** (e.g.,

## 8

full access or partial access). A user may also configure one or more user settings **705** of call control unit **135**. Exemplary user settings include display preferences, language preferences, and energy-saving (e.g., sleep setting) preferences. A user may further configure online backup preferences **706**. Online backup preferences **706** may serve to establish the frequency (e.g., daily or weekly) at which information stored in call control unit **135** is backed up online. A user may also configure call control unit **135** to perform certain operations according to a schedule. For example, a user may configure call control unit to forward all incoming calls to a voicemail box during certain hours of the day (e.g., at night) or for a period of days as might be the case when the user will be away from call control unit **135** and/or telephone **130** for a period of days (e.g., on vacation).

FIG. **8** is a block diagram depicting a series of actions call control unit **135** may be enabled to execute when controlling incoming calls or messages **800**, some of which may be user configurable as discussed above with regard to FIG. **7**. Action **801** enables call control unit to block an incoming call according to a phone number associated with the incoming call and calls may be blocked by area code via action **802**. Incoming calls may be blocked by wildcard (action **803**) and private and/or unknown callers may be blocked (action **804**). Incoming calls that are associated with a particular type of phone number may be blocked (action **805**) and incoming calls from spoofed or malformed phone numbers for may be blocked (actions **806** and **807**, respectively). In some embodiments, call control unit **135** may disconnect a blocked call (action **810**), pickup and hang up a blocked call (action **811**), or send a blocked call to voicemail (action **812**). In other embodiments, call control unit **135** may play a recorded message (action **813**) or block call waiting features for an incoming call (action **814**).

Call control unit **135** may also execute privacy and scheduling mode actions **821**, such as only allowing calls from whitelisted phone numbers to be transferred to a telephone (action **822**), only allowing calls from a contact list of phone numbers to be transferred to a telephone (action **823**), only allowing calls from a contact list and a whitelist of phone numbers to be transferred to a telephone (action **824**), and blocking all calls and texts (action **825**).

Call control unit **135** may further identify incoming callers (action **831**) and/or log and/or otherwise record blocked calls and/or messages (action **832**). Call control unit **135** may also report a phone call identified as a spam call to, for example, a server such as server **115** (action **833**). Call control unit **135** may be integrated with the Do Not Call registry of the FCC and FTC (action **834**). Further, call control unit may add phone numbers associated with blocked incoming calls to a user's blacklist (action **835**) and/or add reported phone numbers to a user's blacklist (action **836**).

FIGS. **9A** and **9B** illustrate exemplary user interfaces by which a user, such as user **145**, may interact with and/or configure systems **100**, **101**, **200**, and/or any component included therein. For example, user interface **900** of FIG. **9A** displays an exemplary set of settings for a call control unit. User interface **900** may be displayed responsively to a user selection of "Settings" from a list of call control configuration information/options **915**. User interface **900** may include a network settings window **905**. Network settings window **905** may include information regarding various settings (e.g., IP address, gateway ID, primary DNS, secondary DNS, netmask ID, etc.) and some, or all, of these settings may be user configurable or set automatically by default. User interface **910** may further include a call block-



## US 9,491,286 B2

## 9

ing window **910**. Included within call blocking window **910** may be user configurable settings for call blocking (block anonymous calls, report blocked calls, etc.) FIG. **9B** displays a dashboard user interface **901** including features such as a listing of last calls **920**, a white list **925**, a black list **930**, an infographic **935**, and a statistics display **940**. Exemplary infographic **935** and statistics display **940** may relate to, for example, incoming call and/or call control activity. One or more of the features of user interface **901** may be interactive so that, for example, when a feature is selected by a user, additional information and/or configuration options related to the feature are displayed (not shown).

FIG. **10** depicts a process diagram illustrating an exemplary process **1000** for controlling a call. Process **1000** is executed via communication between PSTN **105**, call control unit **135**, telephone **130**, server **115** and data store **120**. In step **1010**, an incoming call with caller identification received by PSTN **105** may be communicated to call control unit **135**. Exemplary caller identification information includes a name of an individual, company, or business entity associated with the incoming call, a time of day at which the call is incoming to the PSTN, and a geographic location associated with the call. The caller identification information may then be communicated to server **115** (step **1015**). Server **115** may then request additional caller information from data store **120** (step **1020**) and, if the requested information exists (i.e., is stored in data store **120**), it is communicated to server **115** (step **1025**). Additional caller information may include, for example, whether the caller is associated with a user's blacklist or whitelist or a "do not call list." When the additional information exists, server **115** may communicate it to call control unit **135** (step **1030**) which may, in turn, perform an operation on the incoming call responsively to the additional information (step **1035**). The operation performed may be one or more of the operations described below with reference to FIG. **11**. For example, call control unit **135** may transmit the incoming call to telephone **130** and enable telephone **130** to receive the incoming call (step **1035a**). Alternatively, call control unit **135** may forward the incoming call to a voice mailbox (step **1035b**) or answer and then terminate the incoming call (step **1035c**). Call control unit **135** may also transmit a recorded message to the caller and terminate the incoming call (step **1035d**) or simply terminate the incoming call (step **1035e**).

FIG. **11** depicts a process diagram illustrating an exemplary process **1100** for generating a spam score for identification information associated with an incoming call. Process **1100** is executed via communication between PSTN **105**, call control unit **135**, and server **115**. In step **1101**, an incoming call and caller identification information is received at PSTN **105** and is routed to call control unit **135** (step **1110**). Call control unit **135** then analyzes the incoming call and associated identification information and executes one or more operations on the incoming call such that in step **1102**, the incoming call is blocked or at step **1104** the incoming call is let through to, for example a telephone.

When the incoming call is blocked, as in step **1102**, a blocked call report may be generated and sent to server **115** (step **1120**). Blocked called report may include, for example, configuration settings utilized by call control unit **135** to analyze the incoming call, identification information associated with the incoming call, and/or block the incoming call and/or information relating to the call, the caller, and/or the called party. Next, in step **1103**, server **115** may evaluate a blocked calls count for the caller utilizing, for example, the block call report of step **1120** and other information accessible by server **115** relating to the blocked call.

## 10

When the incoming call is not blocked, a monitoring report may be generated and sent to server **115** (step **1130**). The monitoring report may include, for example, configuration settings utilized by call control unit **135** to analyze the incoming call and/or not block the incoming call and/or information relating to the call, the caller, and/or the called party. Next, and step **1109**, server **115** may evaluate an originated calls count for the caller utilizing, for example, monitoring report **1130**, blocks call report **1120**, and/or other information accessible by server **115** relating to the call.

In step **1106**, server **115** may evaluate an origin and/or destination of the caller in order to determine, for example, an entity (e.g., telemarketer or spammer) responsible for placing the call. In step **1107**, third-party data relevant to the caller may be collected. Exemplary third-party data includes FCC/FTC Do Not Call Registry information as well as information from other public and/or private sources (e.g., state or local governmental agencies). Server **115** may then determine a spam score for the caller. The spam score may be a representation of a probability that a caller is placing unwanted calls or a degree to which the caller is known to place unwanted calls. In cases where a spam score has already been associated with the caller, server may, at step **1199**, update the spam score according to the evaluation.

FIG. **12** depicts a process diagram illustrating an exemplary process **1200** for using a spam report submitted by a user to generate or modify a spam score for identification information or phone number(s) associated with an incoming call. Process **1200** may be executed by, for example, user **145**, call control unit **135**, and server **115**, wherein at step **1210** a user generates and files a spam report. Exemplary user generated spam reports may include caller identification information (e.g., phone number), call type (e.g., telemarketer, potential danger of identity theft, etc.), and/or time of day call was received. The spam report may then be submitted to call control unit (step **1212**) and/or communicated to server **115** (step **1211**).

In some embodiments, user **145** may elect to add the caller's phone number to a personal blacklist (step **1216**) and, upon submitting this election to call control unit **135**, call control unit **135** may then add the phone number to the user's personal blacklist stored on call control unit **135** (step **1217**). Call control unit may also notify server **115** that the caller's phone number has been added to the user's blacklist.

In other embodiments, user **145** may elect to add the caller's phone number to a personal whitelist (step **1219**) and, upon submitting this election to call control unit **135**, call control unit **135** may then add the phone number to the user's personal whitelist stored on call control unit **135** (step **1220**). Call control unit may also notify server **115** that the caller's phone number has been added to the user's whitelist.

In step **1299**, server **115** may generate a spam score for the caller's identification information/phone number using one or more of the following evaluations: the number of spam reports associated with the caller's phone number (step **1211**), the rate of receipt of incoming reports relating to the caller's phone number (step **1213**), the credibility of user **145** (i.e., is the user know for submitting false or correct spam reports) (step **1214**), the quality of the report (step **1215**), wherein reports of a higher quality are weighted more highly than reports of lower quality, and/or the number of blacklists (step **1218**) or whitelists (step **1221**) the caller's phone number appears on. The evaluations may be weighted so that evaluations that are deemed more dispositive for evaluating a spam score are weighted more highly than other considerations.



## US 9,491,286 B2

## 11

Hence, methods, systems, and devices for inbound call control have been herein described.

What is claimed is:

1. A method comprising:
  - receiving an incoming call from a caller at a call control unit communicatively coupled to, or resident within a telephone, the call control unit being positioned between a telecommunication service provider providing the incoming call and the telephone, the incoming call being associated with a telephone number and the caller; and
  - querying, by the call control unit, a server to determine whether additional information associated with the telephone number and the caller exists, and if so, determining whether the additional information indicates that a negative characteristic is associated with at least one of the caller and the telephone number and, if so, performing a first operation on the incoming call responsively to the additional information, otherwise, performing a second operation on the incoming call responsively to an absence of the additional information.
2. The method of claim 1, wherein determining whether additional information regarding a caller associated with the identification information exists is performed at the call control unit using information retrieved from a locally accessible data store.
3. The method of claim 1, wherein determining whether additional information regarding a caller associated with the identification information exists comprises:
  - forwarding the identification information from the call control unit to a server, wherein the server is operative to determine whether the additional information regarding a caller associated with the identification information exists; and
  - receiving from the server, if the additional information exists, the additional information regarding the caller associated with the identification information, otherwise receiving from the server an indication that no additional information exists.
4. The method of claim 1, wherein the first operation is at least one of blocking the incoming call, forwarding the incoming call to a voice mailbox, transmitting the incoming call to the telephone, enabling the telephone to receive the incoming call, and answering the incoming call and then terminating the incoming call.
5. The method of claim 1, wherein the additional information includes a user-configurable list of at least one of desired callers and undesired callers.
6. The method of claim 1, wherein at least one of the first and second operations performed on the incoming call is user configurable.
7. The method of claim 1, further comprising:
  - receiving an indication at the call control unit that the incoming call is undesired; and
  - communicating, by the call control unit, the indication to the server.
8. The method of claim 1, wherein the additional information includes a user-configurable list of undesired callers, the method further comprising:
  - receiving an indication at the call control unit that the incoming call is undesired; and
  - automatically adding the identification information for the undesired incoming call to the user-configurable list of undesired callers.

## 12

9. The method of claim 1, wherein the additional information includes at least one of caller identification information and a spam score.

10. A call control unit comprising:

- an input for receiving an incoming call for a telephone from a telecommunication service provider, the incoming call being associated with a telephone number and a caller;
- a processor communicatively coupled to the input, the processor being configured to query a server to determine whether additional information associated with the telephone number and the caller exists, and if so, determining whether the additional information indicates that a negative characteristic is associated with at least one of the caller and the telephone number and, if so, performing a first operation on the incoming call responsively to the additional information, otherwise, performing a second operation on the incoming call responsively to an absence of the additional information; and
- a communication port configured to enable the call control unit to communicate with a telephone responsively to at least one of the first operation and the second operation.

11. The call control unit of claim 10, wherein the first operation is at least one of: blocking the incoming call, forwarding the incoming call to a voice mailbox, transmitting the incoming call to the telephone, enabling the telephone to receive the incoming call, and answering the incoming call and then terminating the incoming call.

12. The call control unit of claim 10, further comprising: a memory communicatively coupled to the processor, the memory being configured to store the additional information.

13. The call control unit of claim 10, wherein the additional information includes a user-configurable list of at least one of desired and undesired callers.

14. The call control unit of claim 10, wherein at least one of the first and second operations performed on the incoming call is user configurable.

15. The call control unit of claim 10, wherein the input is further configured to receive an indication that the incoming call is undesired and the processor is further configured to communicate the indication to a server.

16. The call control unit of claim 10, wherein the additional information includes a user-configurable list of undesired callers, the input is configured to receive an indication at the call control unit that the incoming call is undesired and the processor is further configured to automatically add the identification information for the undesired incoming call to the user-configurable list of undesired callers.

17. A system comprising:

- a telephone network communicatively coupled to a call control unit, the telephone network being configured to transfer an incoming call to a call control unit communicatively coupled to or resident within a telephone and positioned between a telecommunication service provider providing the incoming call and the telephone;
- the call control unit configured to receive the incoming call, the incoming call being associated with a telephone number and a caller, the call control unit being further configured to query a server to determine whether additional information regarding a caller associated with the telephone number and the caller exists and, if so, determining whether the additional information indicates that a negative characteristic is associated with at least one of the caller and the telephone number



13

and, if so, performing a first operation on the incoming  
call responsively to the additional information, other-  
wise, performing a second operation on the incoming  
call responsively to an absence of the additional infor-  
mation, wherein at least one of the first and second 5  
operation is transferring the incoming telephone call to  
the telephone; and  
the telephone for receiving the incoming telephone call  
from the call control unit.

18. The system of claim 17, wherein the call control unit 10  
is further configured to request the additional information  
from a server, the system further comprising:

a database configured to store the additional information;  
and

the server communicatively coupled to the call control 15  
unit and the database, the server being configured to  
transmit a request to the database for the additional  
information, receive the additional information from  
the database, and transmit the received additional infor-  
mation to the call control unit. 20

\* \* \* \* \*

14